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ABSTRACT

This document is a checklist of 257 energy management options for small business and local government. The energy management options are categorized under: (1) Energy management strategies; (2) Buildings; (3) Lighting; (4) Water; (5) Waste operations; (6) Equipment; (7) Transportation; and (8) Food preparation. To select options for implementation, the "yes" or "no" options were given; then for each "yes" option the degree of implementation (never, sometimes, always) was to be checked. In this way a simple energy audit could be done. Energy management options range from "Appoint an energy management coordinator" and "Alter employee scheduling for increased energy efficiency" to "Use humidifiers to regulate moisture level" and "Walk instead of drive." The introduction and the footnotes to specific options point out possible safety, legal, or cost considerations that small businessmen and local government officials should be aware of. Several references are also given. (MR)

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SELECTED ENERGY MANAGEMENT OPTIONS FOR SMALL BUSINESS AND LOCAL GOVERNEMNT

by

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INTRODUCTION

This comprehensive energy conservation option list identifies over 250 potential energy saving practices and procedures available to small businessmen and local government officials. The selected options, if implemented, can result in a significant reduction in total energy consumption. However, every option is not a potential energy saver for all businesses, institutions, or offices.

To select options for implementation, first read each and check the "yes" column if this option is applicable to the situation you are assessing. If the option is not related to the situation, check the "no" column. If you checked "yes," then check the column which represents the level the option is currently being implemented. Concentrate on examining the applicable options that have never been implemented. Examine these selected options for cost-effectiveness. Often the initial investment necessary to institute the option prohibits its implementation. You will realize that there are many options which can be implemented at little or no expense. These no expense options can usually be implemented easily. Before implementing any options, several questions should be asked concerning the potential impacts they could have. It is important to consider such things as:

- personal safety
- property security
- insurance implications
- legal barriers
- business losses

In addition, evaluate each relevant option considering possible sources of technical/financial assistance, adaptibility/practicality to your situation, the availability of government grant and tax incentive programs, and the potential interrelationships with other programs including water, resource and waste management. Particularly scrutnize any options accompanied by a footnote. Footnotes follow the list of options. Selected references for additional information are included. For specific assistance, contact your state energy office, local utility, building contractor, or heating and cooling systems dealer.

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
Energy Management Strategies					
1. Appoint an energy management coordinator.					
2. Establish an energy management program.					
3. Conduct a comprehensive energy consumption audit for all facilities.					
4. Record audit information for easy analysis.					
5. Provide energy conservation education programs for employees.					
6. Post "turn lights out" signs next to switches.					
7. Purchase energy efficient equipment, building materials, and products.					
8. Encourage legislation requiring a deposit on beverage bottles and cans.					
9. Initiate recycling activities.					
10. Evaluate alternative energy sources for cost-effectiveness.					
11. Encourage public transportation services and facilities.					
12. Provide and encourage use of bikeways and storage racks.					
13. Establish and coordinate ride-sharing programs.					
14. Encourage personal conservation habits at work and home.					
15. Encourage zoning regulations which require efficient energy use.					
16. Encourage building standards which require energy efficient design.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
17. Utilize energy efficient designs in construction.					
18. Discourage unnecessary travel.					
19. Arrange furniture for energy efficiency.					
20. Consume electricity during off peak hours. *					
21. Schedule operations and processes to increase energy efficiency.					
22. Alter employee scheduling for increased energy efficiency.					
23. Train and utilize maintenance personnel to service, inspect, and repair HVAC systems and other equipment.					
24. Report faulty or inefficient equipment to maintenance department promptly.					
25. Alter clothing to compensate for temperature adjustments.					
26. Penalize use of company vehicle for personal business.					
27. Establish an awards program for employees who recommend or implement energy conserving ideas.					
28. Promote energy education programs at all levels in schools.					
29. Evaluate the effectiveness of energy management programs regularly.					
Buildings					
30. Set thermostat at 68°F or lower in heating season.					
31. Set thermostat at 78°F or higher in cooling season.					
32. Set thermostat back to 55°F at night in winter. *					
33. Calibrate thermostat accurately.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
34. Set thermostat back to 50°F if building is unoccupied for several days.					
35. Adjust thermostat to daytime setting shortly before occupants arrive and to nightime setting shortly before occupants leave.					
36. Install time clocks to control thermostat.					
37. Lock thermostat controls in public areas.					
38. Replace faulty thermostat.					
39. Prevent light and heat sources from affecting thermostat.					
40. Turn heat off and drain water from pipes when building is unoccupied for long periods. *					
41. Use humidifiers to regulate moisture levels.					
42. Substitute plants and water pans for humidifiers.					
43. Adjust heating, ventilating and air conditioning systems (HVAC) to optimum efficiency levels. *					
44. Maintain service or clean HVAC equipment such as radiators, coils, and filters.					
45. Install interlocking controls to prevent joint operation of both heating and cooling systems.					
46. Shut off HVAC systems in unused areas. *					
47. Close doors to unused areas.					
48. Minimize operation of HVAC systems in warehouses, storage rooms, hallways, and stairwells when practical.					
49. Minimize use of outside air for ventilation when a significant difference exists between interior/exterior temperature.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
50. Install individual switching for all HVAC systems including exhaust fans.					
51. Close windows tightly in winter.					
52. Open drapes when exposed to sunlight in winter.					
53. Close drapes when exposed to sunlight in summer.					
54. Close loading dock doors when not in use.					
55. Use air curtains in winter around loading dock doors.					
56. Install automatic door closers when practical.					
57. Install insulated drapes.					
58. Replace missing boards, shingles, and siding.					
59. Replace broken windows immediately.					
60. Install thermopane storm doors and windows.					
61. Caulk and weatherstrip doors, windows, air conditioners, and building joints.					
62. Turn off ventilating equipment when building is unoccupied.					
63. Intake cool night air into building during cooling season.					
64. Lower ceilings or install a low speed recovery fan to retain hot air.					
65. Install sufficient roof insulation, R-33 in Pennsylvania.					
66. Install sufficient wall and floor insulation, R-19 in Pennsylvania.					
67. Install perimeter insulation around on-grade concrete floor slabs.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
68. Insulate crawl spaces.					
69. Insulate air ducts, heating and cooling pipes.					
70. Rearrange air ducts to improve air distribution.					
71. Plant deciduous plants on south and west exterior walls of buildings.					
72. Plant evergreen trees on north and east exterior walls of buildings.					
73. Install roof mounted water spray systems to reduce undesirable solar heating.					
74. Install reflective roof coatings to reduce undesirable solar heating.					
75. Install reflective films on windows to reduce undesirable solar heating.					
76. Install window awnings in summer and remove in winter.					
77. Install skirting around raised floors.					
78. Install heat recovery equipment and/or venting to heat producing equipment.					
79. Group heat producing equipment together.					
80. Add vestibules to reduce losses when exterior doors are open.					
81. Add solar collectors to assist conventional heating system.					
82. Avoid use of elevators and esculators.					
83. Turn off unneeded elevators and esculators.					
84. Seal top and bottom of elevator shaft to prevent heating and cooling losses.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
85. Schedule operations, including maintenance to minimize total building use.					
86. Prevent obstacles from blocking air flows.					
87. Close fireplace dampers and exhaust vents when not in use.					
88. Utilize wood burning stoves when practical. *					
89. Adjust gas pilot light to optimum levels.					
90. Install electric ignition to replace gas pilot light.					
91. Turn off gas pilot light in furnace in summer.					
92. Obtain a flue gas analysis in furnaces and service controls as necessary.					
93. Flush radiators, boilers, and other equipment containing water regularly.					
94. Convert from oil and natural gas to coal fired burners and furnaces when feasible.					
95. Clean fire walls in boilers.					
96. Remove water scale from boilers.					
97. Avoid using large boilers when small boilers meet requirements.					
98. Inspect and clean coal fired stokers, grates, and controls.					
99. Inspect, repair or replace door seals and gaskets.					
100. Keep boiler and furnace doors tightly closed during operation.					
101. Remove ashes and clean chimney frequently.					
102. Repair leaks and breaks in water, steam and air lines.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
103. Minimize or eliminate use of window air conditioners.					
104. Locate window air conditioners on the shady side of the building.					
105. Cover window air conditioners in winter.					
106. Install high performance, low leakage dampers.					
107. Inspect and repair ventilating dampers and air valves.					
108. Inspect, clean, and replace oil burner lines and strainers.					
Lighting					
109. Purchase energy efficient light fixtures.					
110. Minimize or eliminate unnecessary lights (outdoor, parking lot, and display). *					
111. Minimize or eliminate roadside advertisements requiring electricity.					
112. Eliminate decorative lighting.					
113. Install high pressure sodium street lamps instead of filament or mercury vapor lights when feasible.					
114. Utilize sunlight fully, open curtains, drapes, and shades during daytime.					
115. Remove unnecessary light fixtures.					
116. Remove alternate bulbs in hallways, stairwells, and other areas as practical.					
117. Replace inefficient light fixtures.					
118. Replace incandescent fixtures with fluorescent fixtures.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
119. Replace multiple low-wattage lights with fewer fixtures of increased wattage.					
120. Install energy saving light bulbs.					
121. Relamp fixtures on a regular schedule.					
122. Clean light fixtures and bulbs regularly.					
123. Arrange locations of fixtures to increase lighting effectiveness.					
124. Lower light fixtures in rooms with high ceilings.					
125. Install individual controls for light fixtures.					
126. Install time clock controls on lighting fixtures.					
127. Install photocell switching to automatically control lighting levels.					
128. Paint walls and ceilings light colors.					
129. Clean walls and ceilings frequently.					
130. Test light levels periodically and adjust lighting as necessary.					
131. Add triple glazed, well insulated skylights to supplement lighting. *					
132. Locate work areas requiring the most light near windows.					
133. Group activities requiring similar light levels.					
Water					
134. Minimize water use, particularly hot water.					
135. Minimize hot water temperatures.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
136. Use a heat exchanger to heat incoming water from waste hot water.					
137. Install equipment to heat water with waste heat.					
138. Purchase energy efficient equipment.					
139. Replace inefficient equipment promptly.					
140. Insulate electric hot water tanks and pipes and add padding between tanks and floors. *					
141. Repair leaks, drips and breaks promptly.					
142. Utilize flow reducing valves and fixtures.					
143. Inspect, clean, and drain water heaters and tanks frequently.					
144. Schedule cleaning and washing operations consecutively to reduce preheating processes.					
145. Install a water saving device in the toilet tank.					
146. Install sink faucets that turn off automatically.					
147. Use sink stoppers.					
148. Use cold water cleaning and rinsing processes.					
149. Locate water heaters close to points of greatest consumption.					
150. Reduce hot water temperatures and add boosters for special need areas (kitchens, laundries, etc.)					
151. Turn off water coolers in drinking fountains.					
152. Replace free-running fountains with spigots requiring glasses or cups.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
153. Reduce use of lawn sprinklers.					
154. Install solar collectors to assist conventional hot water heating system including swimming pool heaters.					
Waste Operations					
155. Purchase beverages in returnable containers.					
156. Use durable products instead of disposables.					
157. Avoid purchasing overpackaged goods.					
158. Donate reusable items to charity.					
159. Use organic waste or compost instead of fertilizer when available. *					
160. Implement recycling programs.					
161. Optimize waste collection schedules and routes; avoid congested streets.					
162. Reduce the frequency of trash pickups.					
163. Require curbside trash pickups; avoid backyard pickups.					
164. Establish waste transfer stations when practical.					
165. Produce methane gas from waste.					
166. Burn solid waste for fuel.					
167. Recycle waste oil.					
168. Reuse paper products, particularly office supplies.					
169. Roll up old newspapers and burn in fireplace, except color print.*					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
170. Compress garbage before disposal.					
Equipment					
171. Turn equipment off when not needed.					
172. Purchase energy efficient equipment.					
173. Repair or replace inefficient equipment or parts.					
174. Eliminate non-essential equipment.					
175. Utilize multiple and variable speed equipment, i.e. fans, pumps, blowers and compressors.					
176. Install capacitors to control electric demands.					
177. Install individual switching for electrical equipment.					
178. Install waste recovery equipment for heating, cooling or water oriented processes.					
179. Properly clean and maintain equipment.					
180. Use equipment according to manufacturer's directions.					
181. Match equipment to job size.					
182. Replace oversized motors with smaller motors.					
183. Keep cutting edges sharp.					
184. Substitute hand tools for power tools when practical.					
185. Reduce the number of energy consuming operations by using equipment to capacity.					
186. Keep air flow to equipment free from obstacles.					
187. Eliminate or minimize use of electric snow melting equipment. *					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
188. Repair faulty electrical contacts and connections.					
189. Utilize baffles in exhaust systems to prevent penetration by outside air.					
190. Inspect, repair, or replace door seals, gaskets, and linings on heating and cooling equipment.					
191. Inspect, repair, or replace heating and cooling pipes and valves.					
192. Clean electric heating elements frequently.					
193. Repair or replace faulty steam traps and heating and cooling coils.					
194. Minimize heating temperatures and water pressures when practical.					
195. Unclog lines and repair leaks in refrigeration and compressed air systems.					
196. Locate air compressors in cool places.					
197. Use time clocks to control vending and amusement equipment when practical.					
198. Clean fan blades frequently.					
199. Inspect and replace screens and nozzles as necessary.					
200. Inspect and replace worn bearings, belts, and pulleys.					
201. Lubricate machinery, particularly gear boxes and drives.					
202. Inspect and maintain proper alignment between motor and drive equipment.					
203. Adjust air and water flow to air cooled condensers.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
204. Clean intake louvers.					
205. Inspect, service and repair swimming pool filtering and heating systems.					
Transportation					
206. Establish and coordinate ridesharing programs.					
207. Utilize public transportation.					
208. Utilize bicycles, mopeds, and motorcycles. *					
209. Walk instead of drive.					
210. Purchase energy efficient vehicles and equipment, particularly consider engine size.					
211. Minimize the use of energy consuming automobile options, i.e. air conditioning, power steering, power windows, automatic transmission, etc.					
212. Coordinate, minimize or eliminate deliveries when possible.					
213. Avoid traffic congestion, plan ahead, use CB radios.					
214. Computer program bus and truck routes.					
215. Implement preventive maintenance program for vehicles.					
216. Keep engines properly tuned.					
217. Inflate tires properly, align and balance wheels.					
218. Replace worn air, fuel, and oil filters.					
219. Install radial tires.					
220. Maintain proper tension on belts.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
221. Replace faulty thermostats.					
222. Plan errands to reduce number of trips and total fuel consumption.					
223. Remove excess weight from vehicles. *					
224. Avoid prolonged engine warm up.					
225. Avoid idling cars for more than one minute.					
226. Repair transportation facilities and roads as necessary.					
227. Purchase and use recommended fuels and lubricants.					
228. Match vehicle job size.					
229. Obey speed limits.					
230. Accelerate and deaccelerate slowly; maintain steady speed.					
231. Avoid riding the brakes.					
232. Never overfill fuel tanks.					
233. Install fuel saving devices on vehicles.					
234. Maximize load to minimize the number of trips.					
235. Pre-cool refrigerated trailers only as necessary.					
236. Use smooth sided trailers.					
237. Utilize (on premise) bulk fuel storage facilities. (Be aware of government regulations and safety concerns.)					
Food Preparation					
238. Turn off unnecessary equipment.					
239. Inspect, clean, and maintain all equipment.					

ENERGY MANAGEMENT OPTION	Applicable		Degree of Implementation		
	Yes	No	Never	Sometimes	Always
240. Repair or replace faulty or inefficient equipment.					
241. Cook at the lowest possible temperature.					
242. Cook in large volumes when possible.					
243. Avoid heating foods longer than necessary.					
244. Preheat equipment only as necessary.					
245. Load equipment without blocking air or water flows.					
246. Load equipment to capacity; don't overload, especially fryers.					
247. Thaw frozen foods before cooking.					
248. Allow warm foods to cool before refrigerating or freezing.					
249. Match equipment to job size, particularly pan to burner.					
250. Clean heating and cooling surfaces and coils frequently.					
251. Inspect, repair, or replace door seals on ovens, coolers, freezers, etc.					
252. Schedule energy consumption during off peak hours when practical.*					
253. Keep oven, cooler and freezer doors closed.					
254. Install covers on topless coolers and heating equipment when practical.					
255. Install and accurately calibrate thermostats on heating and cooling equipment.					
256. Remove frost from freezers frequently.					
257. Prevent equipment and exhaust fans in the kitchen from affecting temperatures in dining room.					

*FOOTNOTES

#20	Consult your local utility company.
#32 & 40	This will not be feasible when the situation dictates specific temperatures.
#43	Consider building codes for public buildings.
#46	Make sure frozen pipes or damaged property don't result.
#88	Consider safety concerns.
#110	Consider personal safety and damage to property.
#131	Consider costs of escaping air.
#140	Don't insulate gas hot water tanks
#159	Compost may not supply all requirements.
#169	Color print may give off potentially hazardous fumes.
#187	Consider health risk if removed by hand.
#208	Consider safety concerns.
#223	Weight added to improve traction on slippery roads in winter should be removed in summer.
#252	Consult your local utility company.

SELECTED REFERENCES

Selected Resources for Developing Energy Conservation Programs in the Business Sector, Lengyel, D. L., J. M. Wert, and B. K. Worthington. 1978.

Selected Resources for Developing Energy Conservation Programs in the Government Sector, Lengyel, D. L., J. M. Wert, and B. K. Worthington. 1978.

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